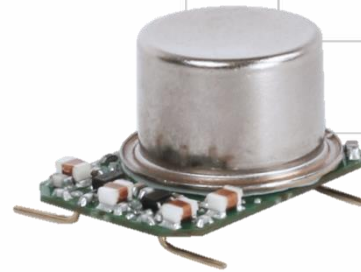


# VFOV406

## OCXO – Ultra Low Power

### Features

- 5MHz to 300MHz frequency range
- Fast warm-up
- Ultra low power consumption
- Sinewave or HCMOS output
- Vibration resistant construction



Dimensions: 21.85 x 15.1 x 10 mm

### Description

The VFOV406 is a high stability, low power OCXO that utilizes Internal Heating Resonator (IHR) technology. The entire oven control system along with the SC resonator are housed inside of the TO-8 vacuum enclosure to reduce OCXO size, power consumption and warm-up time. Applications for this product include PLL reference for telecom systems, Portable equipment, Instrumentation/Test and Measurement, and Microwave communications.

### Ordering Information

Model	Stability	Temp Range	Supply Voltage	Aging	Output	Frequency
VFOV406	W	D	E	C	H	10.000MHz

Code	Stability
R	$\pm 1 \times 10^{-7}$
T	$\pm 5 \times 10^{-8}$
30	$\pm 3 \times 10^{-8}$
U	$\pm 2 \times 10^{-8}$
V	$\pm 1 \times 10^{-8}$
W	$\pm 5 \times 10^{-9}$

Code	Supply
D	5V $\pm$ 5%
E	3.3V $\pm$ 5%

Code	Temp Range
A	0 to 50°C
B	0 to 70°C
C	-10 to 60°C
D	-20 to 70°C
E	-30 to 70°C
G	-40 to 85°C

Code	Per day	Per year	Frequency
A	5ppb	0.5ppm	$\leq 300$ MHz
B	2ppb	0.2ppm	$\leq 300$ MHz
I	1.5ppb	0.15ppm	$\leq 150$ MHz
C	1ppb	0.1ppm	$\leq 150$ MHz
D	0.5ppb	0.05ppm	$\leq 100$ MHz
G	0.2ppb	0.02ppm	$\leq 50$ MHz

Code	Output
H	HCMOS
S	Sinewave

### Available Frequency Stabilities over Operating Temperature Ranges

Code	Temperature Range	Stability					
		R	T	30	U	V	W
		$\pm 1 \times 10^{-7}$	$\pm 5 \times 10^{-8}$	$\pm 3 \times 10^{-8}$	$\pm 2 \times 10^{-8}$	$\pm 1 \times 10^{-8}$	$\pm 5 \times 10^{-9}$
A	0 to 50°C	*	*	*	*	*	D
B	0 to 70°C	*	*	*	*	D	C
C	-10 to 60°C	*	*	*	*	D	C
D	-20 to 70°C	*	*	*	*	C	B
E	-30 to 70°C	*	*	*	*	C	A
G	-40 to 85°C	*	*	*	D	B	A

### Stability Legend

- \* = Available for all frequencies
- A = Available only for frequencies  $\leq 10$  MHz
- B = Available only for frequencies  $\leq 30$  MHz
- C = Available only for frequencies  $\leq 50$  MHz
- D = Available only for frequencies  $\leq 100$  MHz



## Electrical Specifications

Parameter	Conditions & Remarks	Min	Typical	Max	Unit	
<b>Operating Conditions</b>						
Operating Temperature Range	See "Ordering Information" table	-40	-	+85	°C	
Supply Voltage	$V_{CC}$	3.135 4.75	3.3 5.0	3.465 5.25	Vdc	
Power Consumption	Steady state @ 25°C	-	0.15	0.20	W	
	During warm up	-	0.7	1.2		
<b>Frequency Stability</b>						
Frequency Range	$F_{NOM}$	5		300	MHz	
Temperature Stability	-30 to +70°C; standard option shown. See "Ordering Information" table.	-	±50	-	ppb	
Voltage Stability	$V_{CC} \pm 5\%$	-	±2	-	ppb	
Aging (After 30 days)	Per day	-	-	±0.5	ppb	
	Per year	-	-	±0.05	ppm	
Allan Variance	1s	-	0.02	-	ppb	
Retrace	After 30 minutes	-	-	±20	ppb	
G-Sensitivity (Note 1)	Worst axis	-	1*	-	ppb/g	
Warmup-Up Time	$T_A=25^\circ\text{C}$ ; to within 0.1 ppm accuracy of freq. @ 30 min	-	60	90	seconds	
<b>Output Parameters</b>						
HCMOS/TTL (order code H)	Load		10kOhms / 15 pF			
	$V_H$	$V_{CC} = 5.0\text{V}$	3.8	-	-	V
		$V_{CC} = 3.3\text{V}$	2.4	-	-	
$V_L$		-	-	0.4	V	
Rise / Fall Times	@ 10MHz	-	-	10	ns	
Duty Cycle		45		55	%	
Sinewave Output (order code S)	$V_{CC} = 5.0\text{V}$		+7	+8	-	dBm
	$V_{CC} = 3.3\text{V}$		+3	+5	-	
$R_L$		-	50	-	$\Omega$	
Harmonics		-	-	-25	dBc	
Sub-harmonics (Note 2)	Frequency >30MHz	-	-	-40	dBc	
Phase Noise (Note 3)	Offset	10 MHz (typical)	100 MHz (typical)			
	1 Hz	-90	-			
	10 Hz	-120	-90			
	100 Hz	-140	-120		dBc/Hz	
	1 kHz	-160	-140			
	10 kHz	-165	-150			
	100 kHz	-165	-150			

Note 1. Lower G-sensitivity performance is available. Consult factory.

Note 2. See Model VFOV504 for alternate product at high frequencies and no sub-harmonics

Note 3. For additional phase noise options, consult factory.

## Electrical Specifications continued

### Electronic Frequency Control (option)

Control Voltage	$V_C$	$V_{CC} = 5.0V$ $V_{CC} = 3.3V$	0 0	- -	4.2 2.8	V
Pull Range	From $F_{NOM}$		$\pm 0.5$	$\pm 1$	-	ppm
Deviation Slope	Monotonic, positive	$V_{CC} = 5.0V$ $V_{CC} = 3.3V$	- -	0.6 0.45	- -	ppm/V
Reference output	$V_{REF}$	$V_{CC} = 5.0V$ $V_{CC} = 3.3V$	4.05 2.7	4.2 2.8	4.35 2.9	V

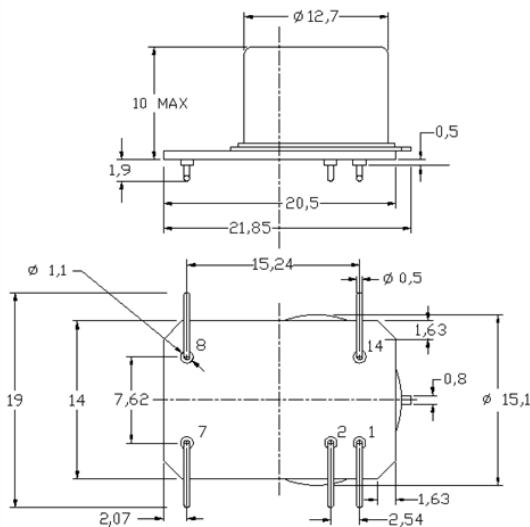
### Absolute Maximum Ratings

Supply Breakdown Voltage	$V_{CC}$	-0.5	-	$V_{CC} + 20\%$	V
Control Voltage	$V_C$	-1	-	9	V

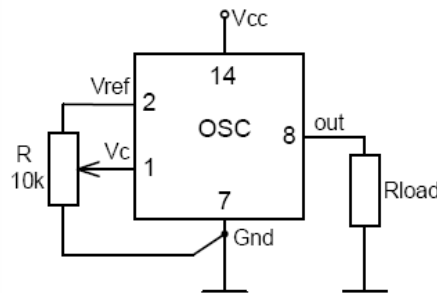
### Mechanical and Environmental

Storage Temperature	-60°C to +90°C
Humidity	Non-condensing, 95%
Mechanical Shock	Per MIL-STD-202, 30g, half sine, 11 ms
Vibration	Per MIL-STD-202, 10g, swept sine to 2000Hz
Soldering Conditions	260°C for 10s. Hand solder only – not reflow compatible
Marking	Epoxy ink or laser engraved

### Mechanical Specifications



All tolerances – 0.1 mm (0.004")



Pin	Connection
1	$V_C$
2	$V_{REF}$
7	Ground
8	Output
14	$V_{CC}$

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.